*IMPERIAL*
*DEPARTMENT OF AGRICULTURE*
*FOR THE WEST INDIES.*

# REPORT

ON THE

# BOTANIC STATION,

AND

# EXPERIMENT PLOTS,

# ST. KITTS-NEVIS.

## 1913-14.

BARBADOS:

ISSUED BY THE IMPERIAL COMMISSIONER OF AGRICULTURE

FOR THE WEST INDIES.

1914.

[Price Sixpence.]

# REPORTS

ON THE

# BOTANIC STATION, ECONOMIC PLOTS AND AGRICULTURAL EDUCATION, ST. KITTS-NEVIS.

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Annual Reports on Certain Economic Experiments conducted in connexion with the Botanic Station, 1900-2.

Annual Reports on the Botanic Station for the years 1901 and 1902.

Annual Reports on the Botanic Station, Economic Experiments and Agricultural Education for the years 1902-3—1913-14.

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## SUGAR-CANE EXPERIMENTS.

### IN BARBADOS.

Report of the Agricultural Work for 1900 :—
Manurial Experiments and Experiments with Varieties of Sugar-cane.

Report of the Agricultural Work for the seasons 1899-1901 to 1908-10.
Parts I and II ; Manurial Experiments. Part III ; Varieties of Sugar-cane.

### IN THE LEEWARD ISLANDS.

Report on Experiments conducted with Sugar-canes in the season 1899-1900.

Reports on Experiments conducted with Sugar-canes in the seasons 1900-1 to 1909-10.

Part I ; Varieties of Sugar-cane. Part II ; Manurial Experiments.

Sugar-cane Experiments in the Leeward Islands, 1911-12 and 1912-13.

Parts I and II published together in Royal 8vo.

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# LETTER OF TRANSMITTAL.

*Commissioner of Agriculture—to Administrator, St. Kitts-Nevis.*

Barbados, January 21, 1915.

No. K. 171.

Sir,

I have the honour to forward the Report on the Botanic and Experiment Stations, St. Kitts-Nevis, for the year ended March 31, 1914.

2. The weather conditions having been better than in the previous year, the Botanic Gardens have maintained a good appearance.

3. The plot experiments at La Guérite with provision crops, having been continued for ten years, must yield data of value to cultivators.

4. As no beneficial result has been obtained from the experiments in hybridizing cotton, they have been discontinued. On the other hand, the important work of seed selection is being successfully carried on.

5. The task of controlling insect and other plant diseases seems to be, on the whole, successfully prosecuted, especially with relation to the diseases affecting cotton. The bad practice of leaving old cotton plants on the fields in contiguity to young, growing crops, unfortunately still seems to continue in some places.

6. It is satisfactory to note that the crops of both the chief industries, sugar-cane and cotton, have yielded fairly good returns, and that with regard to cotton, St. Kitts still maintains its high reputation.

7. The work on the Experiment Station in Nevis with reference to food crops is of value, especially at the present time.

8. It is gratifying that both in Nevis and in Anguilla the cotton crop has been a good one, and that the well-being of the population has been materially increased by this industry.

9. I am glad to remark that the teaching of Agricultural Science in the Grammar School in St. Kitts continues to give good results.

10. In conclusion, I have to exprsss my satisfaction with the work done by the officials of the Agricultural Department of St. Kitts-Nevis, and to refer to the undoubted cumulative value of long-continued careful experiments carried out with a definite object.

I have, etc.,

(Sgd.) FRANCIS WATTS,

Commissioner of Agricultural
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# REPORT OF THE BOTANIC AND EXPERIMENT STATIONS, ST. KITTS-NEVIS,

**For the year ended March 31, 1914.**

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## Work in the Gardens and Observations on Plants.

The gardens have been maintained to the best possible advantage during the year under review, taking into account their unfavourable position, and the badly distributed rainfall.

During the months of June, July, and August, the weather conditions were very trying, and it was only possible to keep some of the plants alive by constant watering.

The rains in the latter part of the year 1913 and the first three months of 1914 have much improved the appearance of the gardens generally, but it is well nigh impossible to attempt to raise any other than very hardy plants in the open.

No actual change has been effected in the gardens during the year, but every care has been taken to keep up, and, if possible, to improve existing conditions.

New roses have been imported from Messrs. Good & Reese, Ohio, to replace those dying out in the rosery, and beds of showy annuals, such as Petunias, Zinnias, Sunflowers, Cosmos and other ornamental plants, have been set out to improve the surroundings.

The rockeries have been kept in good order, and, where necessary, the plants have been renewed.

The hedges of bread-and-cheese and Bougainvillea involve a good deal of labour in keeping them properly trimmed, but now that they are well established they add much to the general tidiness of the paths. Attempts are still being made to establish a logwood hedge on the windward side of the Station along the shore, but its growth is slow owing to the exposed position. The small trial plot of coco-nuts, planted at the southern end of the Station, gives great promise of success, as the plants are growing vigorously. If this is successful the area will be increased.

The lawn tennis courts are still kept up, and much appreciated by the clubs who use them. Four courts are now regularly used by three clubs, who pay all expenses in connexion with their upkeep.

Many of the white cedar trees along the wind-break are attacked by a large borer which causes the limbs to break off. It will be necessary to substitute for these other trees not so liable to be attacked. A few of the Saman trees along the west border have also died out, owing to the same root trouble that was reported in 1911-12

# Work in the Nurseries and Distribution of Plants.

## DISTRIBUTION OF PLANTS.

The chief work in the nurseries has been the raising of ornamental plants, such as palms, ferns, roses, crotons. These command a fairly ready sale to tourists passing through the island, and to residents. The total number sold in this way during the year was 209, of the value of £7 13*s.* 3*d.*

There is little or no demand locally for economic plants, such as limes or cacao, and the demand for trees for shade or wind-breaks is very limited.

Importations of roses and ornamental plants have been made through the Station for the Public Square, and also for a few private individuals. This does not entail any additional expense on the Station, and is a great convenience to the parties concerned.

The total number of plants distributed and sold during the year was 678, consisting of the following :—

| | |
|---|---|
| Palms of various kinds ... ... | 110 |
| Aleurites Fordii ... ... ... | 9 |
| Coco-nut plants ... ... ... | 55 |
| Ornamental plants ... ... | 504 |
| Total ... ... ... | 678 |

## PLANT IMPORTATIONS.

The importations have been chiefly confined to seeds received from the Imperial Department of Agriculture, the U.S. Department of Agriculture, the Botanic Stations of Antigua, Dominica, and Trinidad, and Mr. A. S. Archer, Antigua.

Among those that have been received may be mentioned the following :—

From the Imperial Commissioner of Agriculture, *Pterocarpus Rohrii*, seven plants raised ; Gambia ground nut, planted at the Experiment Station, La Guérite ; *Eurica sativa*, planted at La Guérite ; from U.S. Department of Agriculture, *Kokia Rockii*, three plants raised. From A. S. Archer, Antigua, *Oroxylum indica*, nine plants raised ; from Botanic Station, Antigua, *Kigelia pinnata*, four plants raised ; *Euphorbia Intisy*, planted in rockery.

# Plot Experiments at the Botanic and Experiment Stations.

## PLOTS AT THE EXPERIMENT STATION (LA GUÉRITE).

The plot experiments which are carried on entirely at the Experiment Station at La Guérite are a continuation of those reported on in previous years ; they consist of trials with such crops as sweet potatoes, yams, ground nuts, cassava, onions, tobacco, pine-apples, Guinea corn, Indian corn, cotton, varieties of sugar-cane, and green dressings.

The smaller experiments are conducted in plots of $\frac{1}{10}$-acre in area, named by letters from A to O. These are enclosed by a barbed-wire fence with hedges of bread-and-cheese (*Pithecolobium Unguis-cati*) and white cedar.

The larger experiments with sugar-cane and cotton are carried on outside the station, and comprise 6 acres in cotton, and 4 acres in sugar-cane varieties.

Cuttings and seeds from these crops are distributed or sold to all persons applying for them. The following list gives the number sent out from the station in this way during the year :—

| | |
|---|---|
| Cassava ... ... ... ... ... | 2,900 cuttings. |
| Yams ... ... ... ... ... ... | 247 lb. |
| Indian corn ... .. ... ... ... | 116 ears. |
| Cotton seed, selected .. ... ... ... | 3,176 lb. |
| Varieties cane plants ... ... ... ... | 11,000 cuttings. |

### Sweet Potatoes (plots E and K).

Fourteen varieties of sweet potatoes were planted in these two plots at different times during the year.

In plot K they were planted on May 21, 1913, and reaped on November 12, 1913. The long drought in June and July severely affected the growth of the vines, and the returns from this plot were much below the average in every instance ; in the case of the White Gilkes variety nothing was reaped from the row planted.

In plot E the vines were planted on November 20, 1912, and reaped on June 19, 1913 ; the returns from this were, on the whole, satisfactory.

The following table gives the results of these experiments, and the average during the years these sweet potatoes have been under trial :—

| Variety. | Plot E, yield per acre in lb. | Plot K, yield per acre in lb. | Average yield under experiment. | Number of experiments. |
|---|---|---|---|---|
| Caroline Lee ... | 20,580 | 13,600 | 15,770 | 12 |
| Spooner ... ... | 16,800 | 7,000 | 14,500 | 12 |
| Red Bourbon ... | 16,240 | 13,600 | 14,038 | 12 |
| White Gilkes ... | 11,200 | — | 13,170 | 12 |
| Hug-me-tight ... | 18,200 | 13,600 | 12,710 | 15 |
| Brass Cannon ... | 21,000 | 8,400 | 14,700 | 4 |
| Harriss' ... ... | 28,000 | 9,800 | 11,760 | 4 |
| Bobby ... ... | 15,400 | 9,000 | 11,610 | 15 |
| Mother Kitty ... | 14,000 | 6,300 | 11,470 | 15 |
| Red Hen & Chickens | 26,600 | 14,000 | 10,830 | 15 |
| Playwell ... ... | 18,200 | 4,900 | 11,550 | 15 |
| Montserrat Emma ... | 7,700 | 2,800 | 8,443 | 12 |
| T. 1 ... ... ... | 13,300 | — | 5,851 | 10 |

YAMS (PLOT F).

A crop of onions was reaped from this plot early in the year. Pen manure at the rate of 250 barrels per acre was then applied, and the land made up into 4-foot banks.

On May 29, ten varieties of yams were planted on the banks, the cuttings being all first passed through Bordeaux mixture.

As the weather was very dry, a mulch of cane trash was spread on the banks to conserve moisture, but the long drought of June and July considerably affected the germination and growth of the plants in the early stages, and they never quite recovered. When reaped in January 1913 the returns were very poor, and the size of the yam was small. This was the case with the yam crop throughout the island generally.

The following table gives the result of this experiment, and the average yield for the past ten years :—

| Variety. | Yield per acre in lb. | Average yield per acre for ten years. |
|---|---|---|
| Light Red ... ... ... | 10,230 | 14,228 |
| Seal Top ... ... ... | 13,530 | 13,085 |
| Crop ... ... ... | 8,470 | 11,140 |
| Horn ... ... ... | 4,400 | 10,035 |
| Lisbon ... ... ... | 7,370 | 9,420 |
| Bugle Horn ... ... | 2,200 | 8,990 |
| Bottle Neck Lisbon ... | 5,390 | 8,498 |
| Cush Cush ... ... ... | 550 | 6,560 |
| Oriental ... ... ... | 4,400 | 6,920 |
| Danish ... ... ... | 2,200 | 5,690 |

CASSAVA (PLOT G).

After a green dressing of velvet beans had been turned in, this plot was made up into banks 4 feet wide, and cuttings of ten varieties of cassava were planted on the banks 3 feet apart. The cuttings were treated with Bordeaux mixture before planting.

The drought in the middle of the year severely affected some of the varieties, and only two of them, French No. 3 and Jackroe, gave anything like good returns, the others being much below the average.

Those varieties were planted on February 1, 1913, and were reaped on February 10, 1914.

The following table gives the results of this experiment, and the average result for the past ten years :—

| Variety. | Yield per acre in lb. | Average yield per acre for ten years. |
|---|---|---|
| 1. French No. 3 .. | 38,500 | 14,494 |
| 2. Jackroe ... ... | 19,600 | 12,097 |
| 3. Red Greenaway .. | 8,030 | 11,503 |
| 4. Blue Top ... ... | 8,680 | 11,390 |
| 5. Small Leaf ... ... | 8,400 | 11,193 |
| 6. White Greenaway ... | 9,800 | 9,760 |
| 7. Black Stick ... ... | 7,000 | 9,430 (8 experiments) |
| 8. Bitter No. 4 ... ... | 2,800 | 8,884 |
| 9. Bitter No. 1 ... ... | 7,000 | 7,873 |
| 10. Sweet No. 1 ... ... | 700 | 4,945 |

The yield of French No. 3 was much above the average, each hole giving a return of 11 lb. of fine large roots.

### Ground Nuts (plot l).

Three varieties of ground nuts, the Carolina Running, Spanish, and local were planted in this plot, each variety being $\frac{1}{30}$-acre in area.

The land was carefully prepared, and at the end of April the nuts were planted, the Carolina Running and the local on the flat, 18 inches square, and the Spanish in shallow furrows, 12 inches square. All were passed through Bordeaux mixture before planting.

Most unfavourable weather conditions were experienced during the early stages of growth, and the nuts never recovered from the effects of it.

The Spanish variety matured earlier than the other two, and was reaped on September 11, yielding 60 lb. to the plot, or 1,800 lb. of green nuts per acre.

The Carolina Running and the local were reaped on October 10, with the following results: Carolina Running, 80 lb. to the plot, or 2,400 lb. per acre local, 50 lb. to the plot, or 1,500 lb. per acre.

The Carolina Running again gave the largest returns this season, but the nuts, being of a larger size, are not preferred in the local market.

### (plot d).

A few nuts of Rufisque variety, saved from a nursery planted last season, were sown in plot D, and 60 lb. green nuts were obtained. This variety of ground nuts was received from the Imperial Institute through the Imperial Department of Agriculture.

A small bag of the Gambia ground nut was received from the Imperial Department of Agriculture in April 1913; these were sown in part of this plot in May, and yielded 20 lb. green nuts. These have been kept for future plantings.

### Onions (plot l).

A crop of ground nuts was reaped from this plot early in October; the vines were all buried under, and 25 barrels of pen manure applied. The plot was then carefully cultivated, and laid out in beds 4½ feet wide.

Onion seed, which had been imported from Teneriffe through the Imperial Department of Agriculture, was sown in nursery beds in September, and the young plants from these beds were transplanted into the plot on November 7, 1913. The plants were set out at distances of 9 inches by 4 inches apart.

No trouble was experienced from worms or other pests during the growing stage, and the onions developed very uniformly.

Reaping began on February 22, 1914, and 1,000 lb. green onions was the return from this plot. This resulted in about 606 lb. cured onions, which were sold in the local market, realizing £3, or at the rate of £30 per acre.

### Mazzagua Guinea Corn (plot j).

This plot was planted on August 5, 1913, in a variety of Guinea corn known as Mazzagua. The ears are much longer than the Guinea corn usually planted here and the seed is larger.

The plants grew to a great height, and the weight of the seed made the stalks bend over until they almost reached the ground.

The corn was reaped on January 2, 1914, and gave fine long ears well covered with seed. The total weight of clean seed from this plot was 200 lb., or at the rate of about 35 bushels per acre. This seed was kept for distribution to estates.

## Indian Corn (plots I and E).

Indian corn was planted in plot I in August 1913, with the object of raising cross-fertilized seed. Separate ears of corn were planted on each alternate row, and it was proposed to detassel the stalks on the alternate rows, but the corn was severely attacked by the corn worm, which, although poisoned with a mixture of Paris green and corn meal, did so much damage, that the experiment was spoiled; only sufficient corn being reaped for keeping for future planting.

This experiment was continued in plot E in January 1914 with better success, and the male flowers on each alternate row were detasselled to insure cross-fertilization.

On May 6 this corn was reaped, the self-fertilized rows giving 200 ℔. corn on cob, and the cross-fertilized 180 ℔. corn on cob. The whole plot yielded at the rate of about 50 bushels per acre.

The best of the ears of this corn have been reserved for distribution to planters, and for further sowing in the station.

## Tobacco (plots A and E).

Seeds of Havana and Virginian tobacco, from locally grown plants of last season, were sown in the nursery beds in September 1913, and the young plants from these were transplanted out into the plots on November 7.

The land had been carefully prepared, and made up into banks 3 feet wide, with shallow furrows into which the young plants were set 18 inches apart.

These plants having been put out rather late in the season did not grow very large, but the leaves were of a fair average length, and free from damage by insects.

The tobacco was reaped at the end of January 1914, the plants being cut in pairs for hanging on the rods in the curing house.

On April 16 these were taken down, the leaves stripped off and tied in small bundles for packing in the fermenting box.

One hundred and twelve ℔. of cured tobacco was the result of this experiment, or at the rate of about 600 ℔. per acre. This tobacco will be sold in the local market.

## Pine-apples (plot O).

This experiment, which is a continuation of the experiments with pine-apples reported on in the Annual Reports for 1910-11, and 1911-12, was undertaken to determine if the disease known as the 'black heart' could be controlled by good cultural methods. At the same time manurial experiments, and planting in beds and rows at different distances, were included.

One half of this plot was planted in banks 3 feet wide, suckers 15 inches apart, and the other half flat in beds, suckers 15 inches square.

As this is the third year this plot has been in pine-apples, those planted in the rows having given three crops of fruit, and those in the beds two crops, it was thought advisable to discontinue it, and to use the suckers for planting another plot in an experiment on somewhat similar lines.

The returns for this season have been very small as compared with those for previous years, as many of the plants on the rows had fallen down and died out, and those in the beds suffered from too close planting, which rendered it difficult to keep them clean of weeds.

The following table gives the number and weight of fruit picked from each row and bed for the season :—

| Plot. | Planted in beds. | | | Planted in rows. | | |
|---|---|---|---|---|---|---|
| | Number of fruit. | Weight in lb. | Average weight. | Number of fruit. | Weight in lb. | Average weight. |
| No. 1 ... ... | 35 | 66 | 1·9 | 11 | 23 | 2·1 |
| No. 2 ... ... | 27 | 57 | 2·1 | 23 | 52 | 2·3 |
| No. 3 ... ... | 24 | 54 | 2·2 | 15 | 34 | 2·2 |
| No. 4 ... ... | 16 | 39 | 2·7 | 13 | 31 | 2·4 |
| No. 5 ... ... | 27 | 58 | 2·2 | 23 | 49 | 2·1 |
| No. 6 ... ... | 40 | 78 | 1·9 | 15 | 37 | 2·6 |

The following table gives the number of pine-apples reaped from the planting in rows and in beds, respectively, during the period under cultivation, with the percentage. Those planted in rows were 15 inches apart on 3-foot rows, and those in beds were at distances 15 inches square :—

| Plot. | Number of fruit. Planted in rows. | Per cent. of fruit. | Number of fruit. Planted in beds. | Per cent. of fruit. |
|---|---|---|---|---|
| No. 1 ... ... | 93 | 45 | 85 | 31 |
| No. 2 ... ... | 94 | 45 | 117 | 43 |
| No. 3 ... ... | 74 | 36 | 123 | 45 |
| No. 4 ... ... | 81 | 40 | 116 | 43 |
| No. 5 ... ... | 114 | 56 | 113 | 41 |
| No. 6 ... ... | 84 | 41 | 105 | 10 |

(PLOT M).

Suckers from plot L were used for planting this experiment. The land was laid out in beds 4½ feet wide, and the suckers planted at 18 inches apart, or three rows to a bed.

Manurial experiments were laid out as in the previous plot as follows :—

No. 1 bed No manure.
No. 2 bed Pen manure.
No. 3 bed 10 lb. nitrogen (as tankage) per 1,000 plants.
No. 4 bed 20 lb. potash (as sulphate) „ „ „
No. 5 bed 8 lb. phosphoric acid (as basic slag) per 1,000 plants.
No. 6 bed 10 lb. nitrogen (as tankage), 20 lb. potash, and 8 lb. phosphoric acid (as basic slag).

Bed No. 1 was planted on October 1, 1912, and bed No. 2 on January 11, 1913 ; the other beds were planted in October 1913. Manure was applied on Decembe 5, 1913.

The plants in all the beds grew very badly, and, so far, they all have a very sickly appearance. From an examination made by the Mycologist of the Department it was found that the base of the stems were more or less rotted, which he attributed to the presence of the fungus *Thielaviopsis paradoxa* (ethaceticus).

### Eurica Sativa.

A few seeds of this oil-producing plant were received from Mr. H. A. Tempany, Superintendent of Agriculture for the Leeward Islands, and planted in a nursery. From this 4 ℔. of clean seed has been gathered.

### Sea Island Cotton (plot c).

A sample of Sea Island cotton seed from lint of exceptionally fine quality was sent out to St. Kitts in 1913 by Mr. E. Lomas Oliver, of the Fine Spinners Association, for trial planting.

The seed was planted in August 1913 in this plot, and the plants grew well, bearing heavily, with all the characteristics of good Sea Island cotton plants.

The cotton was picked in February 1914, and yielded 95 ℔. seed-cotton or 20 ℔. lint from $\frac{1}{10}$-acre, or at the rate of 200 ℔. lint per acre.

A sample of this cotton lint, sent on to the British Cotton Growing Association for report, was said to be 'bright, extra fine, long and strong.' The 200 ℔. lint was soon after sold at 30*d.* per ℔.

The seed from this cotton has been distributed to different estates for planting, and an acre has been planted at the Experiment Station.

### Green Dressings.

Green dressings of velvet beans, and horse beans, (*Canavalia ensiformis*) have been grown on many of the plots. These yielded very heavy crops, and were turned in as manure.

### Hedges.

The hedges of bread-and-cheese (*Pithecolobium Unguis-cati*) and white cedar have all been kept in good order during the year, and are both very ornamental and useful as wind-breaks.

## COTTON.

### Manurial and other Experiments.

Manurial and other experiments with Sea Island cotton have again been carried on in connexion with the work of the Experiment Station at La Guérite, and form a continuation of the nine years' experiments. (See Reports Botanic and Experiment Stations, St. Kitts-Nevis, for 1904-5, 1905-6, 1906-7, 1907-8, 1908-9, 1909-10, 1910-11, 1911-12, 1912-13,—Cotton—manurial and other experiments).

The manurial experiments on plots of $\frac{1}{10}$-acre in area in duplicate, extending over an area of about 2 acres, have now been carried on for ten years on exactly similar lines, and on the identical plots, in accordance with the manurial scheme published in the *Agricultural News*, Vol. III, p. 237. Full reports of previous experiments have been published in the *West Indian Bulletin* (Vol. VI, p. 247; Vol. 88, p. 283; Vol X, p. 269; Vol. XI, p. 60; and Vol. XII, p. 1).

The manurial experiments consist of thirty plots in duplicate, known as Series I and II.

A green dressing of horse beans was planted on these plots in February 1913, and turned in under the banks on June 2. The usual time for planting has been

early in June, but the weather conditions were so unfavourable that planting could not be done until July 21, and even then it was difficult to establish a good stand of cotton before the end of August.

Manures were applied, potash and phosphates on August 18, and nitrogen on August 27. These were applied round the young plants at a depth of about 2 inches.

The rains of September and October considerably improved the cotton plants, and first picking commenced on November 1. The cotton ripened very quickly, and first picking was over early in January 1914, no second picking being possible owing to the presence of leaf-blister mite and cotton stainers.

The returns from these manurial plots were very satisfactory, being at the rate of 1,150 lb. seed-cotton per acre.

Tables are attached giving lists of manurial experiments, the results of each plot for the season under review, and the average results of each plot for the ten years that the experiments have been carried on.

| No. of expt. | Nitrogen as nitrate of soda. | Nitrogen as sulphate of ammonia. | Potash as sulphate of potash. | Phosphoric acid as basic phosphate. | Cotton-seed meal. | 1913-14. | | Means. | Difference on No manure. |
|---|---|---|---|---|---|---|---|---|---|
| | | | | | | Series I. | Series II. | | |
| 1 | No manure | | | | | 890 | 1,190 | 1,040 | |
| 2 | Pen manure | | | | | 960 | 1,010 | 985 | −55 |
| 3 | | | 30 | 40 | | 1,435 | 1,300 | 1,368 | +328 |
| 4 | | 20 | 30 | 40 | | 1,275 | 1,200 | 1,238 | +198 |
| 5 | | 30 | 30 | 40 | | 1,295 | 1,300 | 1,298 | +258 |
| 6 | 20 | | 30 | 40 | | 1,310 | 1,400 | 1,355 | +315 |
| 7 | 30 | | 30 | 40 | | 1,000 | 1,290 | 1,145 | +105 |
| 8 | | 30 | 30 | | | 1,162 | 1,045 | 1,104 | +64 |
| 9 | | 20 | | | | 1,060 | 1,220 | 1,140 | +100 |
| 10 | | 30 | | | | 1,100 | 1,085 | 1,092 | +52 |
| 11 | 20 | | | | | 950 | 1,130 | 1,040 | ... |
| 12 | 30 | | | | | 1,210 | 1,060 | 1,135 | +95 |
| Phosphate series | | | | | | | | | |
| 13 | | 30 | 30 | | | 1,162 | 1 045 | 1,104 | +64 |
| 14 | | 30 | 30 | 40 | | 1,295 | 1.300 | 1,298 | +258 |
| 15 | | 30 | 30 | 60 | | 1,230 | 960 | 1,095 | +55 |
| 16 | | 30 | 30 | 80 | | 1,285 | 960 | 1,122 | +80 |
| 17 | | | | 40 | | 1,150 | 1,015 | 1,082 | +42 |
| 18 | | 30 | 30 | 40 | | 1,255 | 930 | 1,092 | +52 |
| 19 | | 30 | 30 | 60 | | 1,230 | 1,170 | 1.200 | +160 |
| Potash series | | | | | | | | | |
| 20 | | 30 | | 40 | | 1,080 | 1,025 | 1,057 | +17 |
| 21 | | 30 | 20 | 40 | | 1,215 | 1,245 | 1,230 | +190 |
| 22 | | 30 | 30 | 40 | | 1,295 | 1,300 | 1,298 | +258 |
| 23 | | 30 | 40 | 40 | | 1,330 | 985 | 1,158 | +118 |
| 24 | | | 40 | | | 1,170 | 1,100 | 1.135 | +95 |
| Cotton-seed meal | | | | | | | | | |
| 25 | | | | | 300 | 1,135 | 1,290 | 1,212 | +172 |
| 26 | | | | | 600 | 1,290 | 1,030 | 1,160 | +120 |
| 27 | | 30 | | | 300 | 1,325 | 1,040 | 1,162 | +122 |
| 28 | | | | 40 | 300 | 1,230 | 1,165 | 1 198 | +158 |
| 29 | | | 30 | 40 | 300 | 1,270 | 1,305 | 1.288 | +248 |
| 30 | | 30 | 30 | 40 | 300 | 1,060 | 1,235 | 1,198 | +158 |

RESULTS OF COTTON MANURIAL EXPERIMENTS AT LA GUÉRITE, ST. KITTS, SERIES I AND II, OVER A PERIOD OF TEN YEARS.

| No. of expt. | Nitrogen as nitrate of soda. | Nitrogen as sulphate of ammonia. | Potash as sulphate of potash. | Phosphoric acid as basic phosphate. | Cotton-seed meal. | Average for ten years. | Difference on No manure. |
|---|---|---|---|---|---|---|---|
| 1 | No manure | | | | | 1,249 | |
| 2 | Pen manure | | | | | 1,306 | +57 |
| 3 | | | 30 | 40 | | 1,263 | +14 |
| 4 | | 20 | 30 | 40 | | 1,325 | +76 |
| 5 | | 30 | 30 | 40 | | 1,263 | +14 |
| 6 | 20 | | 30 | 40 | | 1,384 | +135 |
| 7 | 30 | | 30 | 40 | | 1,205 | −44 |
| 8 | | 30 | 30 | 60 | | 1,291 | +46 |
| 9 | | 20 | | | | 1,151 | −102 |
| 10 | | 30 | | | | 1,265 | +16 |
| 11 | 20 | | | | | 1,352 | +103 |
| 12 | 30 | | | | | 1,203 | −46 |
| Phosphate series | | | | | | | |
| 13 | | 30 | 30 | | | 1,290 | +41 |
| 14 | | 30 | 30 | 40 | | 1,263 | +14 |
| 15 | | 30 | 30 | 60 | | 1,280 | +31 |
| 16 | | 30 | 30 | 80 | | 1,317 | +68 |
| 17 | | | | 40 | | 1,247 | −2 |
| 18 | | 30 | 30 | 40 | | 1,286 | +37 |
| 19 | | 30 | 30 | 60 | | 1,240 | −9 |
| Potash series | | | | | | | |
| 20 | | 30 | | 40 | | 1,188 | −61 |
| 21 | | 30 | 20 | 40 | | 1,197 | −52 |
| 22 | | 30 | 30 | 40 | | 1,263 | +14 |
| 23 | | 30 | 40 | 40 | | 1,290 | +41 |
| 24 | | | 40 | | | 1,242 | −7 |
| Cotton-seed meal | | | | | | | |
| 25 | | | | | 300 | 1,329 | +80 |
| 26 | | | | | 600 | 1,356 | +107 |
| 27 | | | 30 | | 300 | 1,310 | +61 |
| 28 | | | | 40 | 300 | 1,345 | +96 |
| 29 | | | 30 | 40 | 300 | 1,365 | +116 |
| 30 | | 30 | 30 | 40 | 300 | 1,337 | +88 |

| Plant No. | Height of plant. | No. of bolls. | Weight of seed-cotton obtained, grms. | Average length of fibre, mm. | Percentage lint to seed. | Percentage weak fibre. | Strength of fibre. | Fineness. | Lustre. | Regularity. |
|---|---|---|---|---|---|---|---|---|---|---|
| 205 ... | 5 ft. | 216 | 396·2 | 48·3 | 25·0 | 17·2 | Strong | Fine | Lustrous | Regular |
| 206 ... | 2 „ | 40 | 70·7 | 48·8 | 28·5 | ... | Strong | Fine | Lustrous | Regular |
| 208 ... | 3½ „ | 42 | 99·1 | 44·5 | 29·0 | 10·9 | Strong | Fine | Lustrous | Regular |
| 217 ... | 3½ „ | 64 | 226·4 | 49·6 | 31·0 | 19·0 | Strong | Fine | Lustrous | Very regular |
| 220 ... | 4 „ | 105 | 367·9 | 44·2 | ... | 13·5 | Strong | Fine | Lustrous | Regular |
| 325 ... | 3½ „ | 48 | 141·5 | 46·2 | 24·0 | ... | Strong | Fine | Lustrous | Regular |
| 342 ... | 3½ „ | 52 | 198·1 | 48·4 | 28·0 | 13·5 | Very strong | Fine | Lustrous | Regular |
| 416 ... | 4 „ | 67 | 226·4 | 46·1 | 26·6 | 15·3 | Strong | Fine | Fairly lustrous | Regular |
| 420 ... | 3½ „ | 115 | 283·0 | 48·8 | 27·5 | 12·7 | Very strong | Fine | Lustrous | Regular |
| 467 ... | 4 „ | 93 | 226·4 | 42·9 | 28·0 | 11·9 | Strong | Fine | Lustrous | Regular |
| 470 ... | 4 „ | 100 | 283·0 | 46·4 | 30·0 | 13·9 | Strong | Fine | Lustrous | Regular |

Taking first the results extending over a period of ten years, it will be seen that the average of the two No manure plots is 1,249 lb. seed-cotton per acre, while the average of all the plots is 1,289 lb., or practically the same ; and taking the same test as in previous reports, we find that in only one instance, plot No. 6, has there been an increase of 10 per cent. on the unmanured plot.

These results still bear out the experience of past years, that, taking the average over a period of ten years, the addition of artificial manures under the conditions existing at La Guérite has not been attended with remunerative results.

Taking however the results of the season under review, it will be seen that the manures are beginning to exert their influence in the increased yields of many of the manured plots. The average of the two unmanured plots was 1,040 lb., while the average of all the plots was 1,158 lb. or an increase of about 11 per cent. Two of the manured plots, Nos. 3 and 5, gave increases of 30 per cent. of seed-cotton, and twelve plots gave an increse of 10 per cent. each.

In only one instance was there a decrease, and, strange to say, in the pen manure plots in both series. This may be due to the continuous manuring for so many years causing the plants to run more to wood, with fewer bolls. Careful observation will be made on this point in future experiments.

These experiments, which have been again laid out on similar lines, will be the means of affording instructive records on the action of manures on cotton extending over so long a period of years.

In addition to these plot manurial experiments, four experiments of $\frac{1}{5}$-acre in area each, have been laid out in land that has been under cotton for ten years. They consist of :—

1. No manure.
2. Pen manure.
3. Complete manure, artificial.
4. Cotton seed meal.

Two acres of land that had been in ratoon canes were planted in seed from the individually selected plants Nos. 205, 217, 325, and 420, the seed from each plant being used to sow an area of $\frac{1}{2}$-acre.

The land was made up into 5-foot banks, all the trash being buried under. Cross holes $4\frac{1}{2}$ feet apart were dug in the furrows, and the seeds planted two to each cross hole, or at the rate of 3,800 per acre.

Planting was done on May 28, 1913, and from that date until the end of July there was little or no rain. The land being in good condition the seed germinated well, and the young plants kept alive until the rains came.

First picking began on September 22, and all was reaped by end of December, a period of seven months from date of planting.

The total yield of seed-cotton from these 2 acres was 2,090 lb., or at the rate of 1,045 lb. per acre, of which

| | | | | | |
|---|---|---|---|---|---|
| No. 205 | gave at the rate of | ... | ... | ... | 1,196 lb. per acre |
| No. 217 | ,, | ,, | ... | ... | 1,068 ,, ,, ,, |
| No. 325 | ,, | ,, | ... | ... | 1,096 ,, ,, ,, |
| No. 420 | ,, | ,, | ... | ... | 816 ,, ,, ,, |

In addition to this, an acre of land was planted in seed from the other selected plants that have been under careful observation at La Guérite for the past six years. This land has been continuously in cotton for the past ten years, with only one application of 800 lb. cotton-seed meal in 1912.

The return from these plants was comparatively small, which seems to be due to lack of manure after so many years cropping. The total amount of seed-cotton picked from this acre was 678 lb., of which

| | | | | | |
|---|---|---|---|---|---|
| No. 467 | gave at the rate of | ... | ... | ... | 658 lb. per acre |
| No. 470 | ,, | ,, | ... | ... | 752 ,, ,, ,, |
| No. 206 | ,, | ,, | ... | ... | 640 ,, ,, ,, |
| No. 342 | ,, | ,, | ... | ... | 874 ,, ,, ,, |
| No. 208 | ,, | ,, | ... | ... | 660 ,, ,, ,, |
| No. 220 | ,, | ,, | ... | ... | 505 ,, ,, ,, |
| No. 416 | ,, | ,, | ... | ... | 432 ,, ,, ,, |

## Hybrid Cotton.

No further attempt has been made this season to experiment with hybrid cotton, the results so far obtained not warranting the belief that an increase of yield could be gained over the selected Sea Island cotton grown at the experiment station, to compensate for the lower value of the hybrid staple. There was also the great risk of the Sea Island cotton plants under selection being cross-fertilized from the hybrid plants. For these reasons it was thought best to direct all attention to keeping up the high standard of the selected Sea Island plants, both as regards quality and quantity of staple.

The seed from the cross with Barbados Sea Island cotton and St. Eustatius native, F. 4, which was planted out at La Guérite, as mentioned in the Annual Report, 1912-13, resulted in plants that were most disappointing, and in no case were there distinctive characteristics either in yield or quality of staple to warrant any plant being selected for future investigation. The experiment was therefore abandoned.

The total yield of lint cotton from the manurial and other experiments at La Guérite on 6 acres, of which ½-acre was in hybrid cotton, was 1,295 lb. first quality lint, 99 lb. stained cotton, and 38 lb. hybrid cotton, a total of 1,432 lb.

### Routine Selection Work.

Selection work with Sea Island cotton has been carried on during the year under review, on similar lines to that reported on in the Annual Reports, Botanic and Experiment Stations, St. Kitts-Nevis, 1907-8, 1908-9, 1909-10, 1910-11, 1911-12, 1912-13.

Seeds from the individual plants referred to in last year's report as Nos. 416, 420, 325, 342 (S). 205, 206, 217, 220, 467 (V), 470 (V), were again planted out in the experiment plots at La Guérite. Three seeds were selected from each plant with lint possessing best characteristics of length, strength, uniformity, and fineness. These were planted in a nursery at La Guérite, and the cotton from each plant was picked and kept in a bag labelled with the number of the plant. At the end of the season this cotton was subjected to a very careful examination according to the method adopted for judging cotton in the Leeward Islands.

A table is attached giving the different characteristics of these plants.

In addition to this examination a sample of lint, the yield of one of each of the above selected plants, was forwarded to the British Cotton Growing Association, and a report asked for on the staple.

This has since been received, and the thanks of this Department are due to the Association for their willingness to help in this connexion, affording as it does the means of determining the value of the results of the experiments that are being carried on in this selection work from the spinner's point of view.

The report on the different samples was as follows:—

| | | Value. d. |
|---|---|---|
| L. G. No. 205. | Bright, medium length, regular, fine, strong ... ... | 20 |
| L. G. „ 206. | Bright, rather wanting in fineness and strength, irregular | 19 |
| L. G. „ 208. | Bright, medium length, regular, fine, and strong ... | 20 |
| L. G. „ 217. | Bright, very fine, good length, rather wasty ... ... | 20 |
| L. G. „ 220. | Bright, rather wanting in fineness and strength ... | 19 |
| L. G. „ 325. | Bright, very fine and long ... ... ... ... | 20-21 |
| L. G. „ 416. | Bright, staple moderately fine, rather weak, wasty and irregular ... ... ... ... ... ... | 18 |
| L. G. „ 420. | Bright, staple moderately fine, fairly strong, rather wasty | 19 |
| L. G. „ 342. | Bright, staple moderately fine, regular, fairly strong ... | 19 |
| L. G. „ 467. | Bright, staple wanting in strength, moderately fine, not very strong ... ... ... ... ... ... | 18 |
| L. G. „ 470. | Bright, fair length, wanting in fineness, and wasty ... | 18 |

The seed from these selected types has been planted for the coming season, that from each plant being placed in four rows, giving an area of ¼-acre to each.

The practical result of this selection work is most encouraging, the demand for the seed being very great, and the results from it very satisfactory. All the selected seed was sold locally at 2½*d.* per lb., the total amount sold being 3,176 lb.

## Notes on Economic Plants.

### Onions.

Twenty-five pounds white, and 15 lb. red Bermuda onion seed were imported from Teneriffe, through the Imperial Department of Agriculture, and sold to growers at cost and charges.

This industry is only confined to a few private individuals who plant to supply the local market; no attempt is made to develop it on commercial lines. This industry, with co-operation on the part of the growers, might become a valuable asset to the island; the formation of the Antigua Onion Growers' Association will be a good object-lesson in this connexion.

### Cacao.

The cultivation of this crop remains in the same position as was stated in last year's annual report. There has been no extension of the area planted on Mollineux estate.

The older trees on this estate are bearing satisfactorily, and the younger trees on the lower level are very promising.

## Work Connected with Insect and Fungus Pests and Their Control.

### SUGAR-CANE.

During the year under review many of the estates in different parts of the island have suffered considerably from attacks of root disease (*Marasmius sacchari*) and root borer (*Exophthalmus esuriens*).

The Entomologist of the Department paid a special visit in connexion with these pests in January 1914, during which much useful work was done, and suggestions were made as to combating them.

The presence of large numbers of the weevil of *Exophthalmus esuriens* in the cotton fields on one estate was followed by finding that large numbers of the root borer were damaging the canes.

At the time of writing this report it has been conclusively proved that the weevil, *Exophthalmus esuriens*, is the parent of one form of root borer. A stool infected with the root borer was kept under a wire cage, with the result that weevils of *Exophthalmus esuriens* were obtained from it. It was also found that its manner of laying eggs was the same as that of the Barbados *Diaprepes abbreviatus*, the weevils confined in the cage with the growing cane having laid their eggs on the split leaves, cementing them across.

Root disease (*Marasmius sacchari*) was also found to a large extent, and was responsible for much of the shortage in the tonnage of canes per acre, for, where the canes were not actually destroyed, they appeared to be small, and lacking n weight.

Moth borer was present, but not perhaps to any alarming extent.

Rind disease, which was present in 1912 to a considerable extent in one district of the island, has not made its appearance during the year under review.

Termites, which did so much damage to the cane crop on Pond estate for many years, seem to have yielded to the treatment recommended by the Entomologist of the Department, to rotate the crop with cotton for some years. This has been done and there have been few signs of their presence in any number during the year.

## COTTON.

The cotton worm (*Alabama argillacea*) was very prevalent, especially in the latter part of the year 1913. No actual damage was done, because large quantities of poison were used for their destruction.

Leaf-blister mite was, as usual, to be seen when the cotton plants were maturing, but at that time little damage is done. In the past it has been the custom to bury or burn off the cotton bushes after the first picking, and in this way the mite has been kept in check. It is now a matter for regret that in certain instances old cotton was kept standing on the land for months, to the detriment of any young cotton planted in the neighbourhood. This points to the need of legislation to compel planters to destroy their old cotton.

Cotton stainers were very prevalent towards the close of the cotton season. At the experiment station they were present in very large numbers, and traps of all kinds were used for catching and destroying them.

In the Sandy Point district there was much trouble on some estates from a peculiar mottled appearance of the leaves on the cotton plants, together with a stunted or compressed growth. These plants bore an abnormal number of flowers and bolls, but they never matured.

In other places there was a crinkling or curling of the leaves on the upper branches with elongated stems. There was an entire absence of bolls in these cases. This latter trouble seems similar to that mentioned in the report of the St. Croix Experiment Station in 1911-12 and again in 1912-13, and the writer is of opinion that it is the same disease described as leaf cut or tomosis in Circular 120 written by Dr. Cook, issued by the United States Department of Agriculture.

### Disinfection of Plants.

In accordance with the provisions of the Plant Protection Ordinance, fifty-three parcels of seeds, and twenty-two boxes of plants were received at the Botanic Station for fumigation or disinfection at the discretion of the Officer-in-charge.

The materials used, when necessary, for the treatment of these plants and seeds, are hydrocyanic gas, carbon bisulphide, corrosive sublimate, and Bordeaux mixture.

# Progress in the Chief Industries.

## THE SUGAR INDUSTRY.

During the early part of the season the rainfall was very deficient, and the prospect of a fair crop was not very promising, but towards the end of the year the conditions improved, and up to the time of reaping the rains continued, and were well distributed. This resulted in a much better crop than was anticipated, the total crop shipped for the year 1913 being 11,312 tons, of which 6,226 were of 96° grey crystal sugar, and 5,086 muscovado.

The working of the St. Kitt's (Basseterre) Sugar Factory was most successful, the actual output of sugar being greater than in previous years.

By a return supplied by the estates, it is shown that out of a total of 7,027 acres under canes to be reaped in St. Kitts, 67 per cent. is under the new varieties, the remaining 33 per cent. being in the White Transparent variety. B. 147 still keeps up its well deserved reputation both as plant canes and ratoons, and seems suited to all districts. B. 208 has decreased in acreage owing to its liability to root disease (Marasmius), and also to the fact that varieties giving heavier tonnage are preferred under the Central Factory system.

In January 1914 a consignment of one case of sugar-cane cuttings, containing plants of eight varieties, was received from the Department of Agriculture, Mauritius. These cuttings, which had been two months on the voyage, arrived in a very dry state, and although every care was taken in planting and watering, only five plants have been saved.

The sugar-cane experiments continue to form an important part of the work of the Department. They are carried out under the direction of the Government Chemist and Superintendent of Agriculture for the Leeward Islands, the Agricultural Superintendent being responsible for the laying out and control of the field work.

This work involves laying out 347 plots of varieties of sugar-canes, and 210 plots of manurial experiments on sugar-cane, on estates situated in different districts of the island.

The results of these experiments are detailed annually in a separate report, prepared by the Government Chemist, and copies of the results on the individual estates where the experiments were carried on, are forwarded to the Manager in charge.

The main features of the experiments published in the annual report are also brought before a meeting of the Agricultural and Commercial Society, for the information of members.

The following table gives the exports of sugar from the Presidency for the past ten years :—

| Year. | Tons sugar. |
|---|---|
| 1906 ... ... | 15,191 |
| 1907 ... ... | 14,178 |
| 1908 ... ... | 11,044 |
| 1909 ... ... | 12,027 |
| 1910 ... ... | 12,510 |
| 1911 ... ... | 11,139 |
| 1912 ... ... | 10,554 |
| 1913 ... ... | 11,312 |

## THE COTTON INDUSTRY.

The area planted in cotton during the year under review was about the same as the previous year, namely 5,500 acres.

The estimated area planted in each island was as follows :—

| | |
|---|---|
| St. Kitts ... ... ... | 2,000 acres. |
| Nevis ... ... ... ... | 2,500 „ |
| Anguilla ... ... ... | 1,000 „ |
| Total ... ... ... | 5,500 |

### St. Kitts

Of the area planted in St. Kitts 1,600 acres were planted as an intermediate crop with sugar-cane, and about 400 acres as a permanent crop.

Owing to different conditions of climate and rainfall, the time of planting varies considerably in different districts of the island. At higher elevations, and in the northern districts it is found that early planting from February to April is more successful, as the cotton matures before the cold and rainy season sets in. In the valley and southern districts, planting in May and June is the custom, as the rains seldom allow any chance of earlier planting.

The system of planting cotton as an intermediate crop with canes requires a quick maturing cotton, which has to be planted in time to bear its crop before the time for planting cane comes round, otherwise the resulting crop of cane suffers from bad germination. So far, this system has given entire satisfaction, the returns in weight of canes, both plants and ratoons, from fields that had previously been planted in cotton, being up to, and in many cases beyond, the average.

Very unfavourable weather was experienced, especially in the valley district, at the time for planting, and in most cases the cotton was not planted before the end of July. The rains later in the year considerably improved the prospect, but taken generally, the yield of lint was not as good as in previous years, few estates getting a return of more than 200 lb. lint per acre. As far as can be estimated, the average return per acre over the whole island has been about 160 lb. lint per acre.

Reference to the pests and insects affecting this crop will be found under the heading in this report, Work in Connexion with Insect and Fungus Pests.

The quality of the cotton has kept up to a high standard, and the greater part has sold readily at prices from 1*s.* 8*d.* to 1*s.* 10½*d.* per lb. with good reports as to the quality of the staple. The fineness of St. Kitt's cotton seems to be its special feature.

The same ginneries have been at work during the year: the large ginnery at Spooners with oil plant attached, and the smaller ginnery at Stone Fort estate with oil engine and hydraulic press.

Attention having been called by the British Cotton Growing Association to the danger that at present exists in shipping bales of cotton grown in other islands and ginned in St. Kitts, under the St. Kitts mark, it was arranged by the two ginneries that all the bales of cotton grown in St. Kitts should be marked with the words 'Grown in St. Kitts' in easily legible letters, and an Ordinance is under consideration by the Government, imposing a penalty on anyone putting these words on any bale of cotton containing cotton not grown in St. Kitts.

### Nevis.

An account of the cotton industry in Nevis will be found in the report of the Agricultural Instructor. From this it will be seen that although the weather was most unfavourable for the establishment of the young crop, yet the general return was better than the previous year, the average being about 120 lb. lint per acre. The quality of lint was also much superior to previous years, and fetched good prices.

Insect pests were not so numerous this season, and the supply of Paris green and lime stocked by the Government for sale on easy terms to the small growers made it possible for them to obtain it as soon as required for poisoning the cotton worm.

Speaking generally, the past season has been more favourable to the cotton growers in Nevis, and every effort is being made by them to keep up the quality of the lint produced, by planting the best seed obtainable.

### Anguilla.

The usual interesting report from Mr. Carter Rey on the cotton industry in Anguilla is, I regret to say, not available for the season under review.

The cotton season was, on the whole, a fairly successful one; the rains came in late, which caused the crop not to be established before the month of October; but with the good weather that followed the plants grew well, and the results were as a rule satisfactory. The total exports of lint for the season was 94,372 lb. With regard to insect pests, it may be noticed that the cotton worm was conspicuous by its absence, the large number of Jack Spaniards to be seen in the fields being perhaps responsible for this.

The insect, which has been referred to in previous reports as the black beetle did much damage in some districts to the cotton in the very early stage, necessitating replanting in some cases. Specimens of this beetle have been identified as *Lachnopus valgus*, and attempts are being made to study its life-history with a view of suggesting measures for keeping it under control.

The cotton mildew attacked the plants in certain districts to rather an alarming extent, completely defoliating them. This has not occurred before to any extent in Anguilla, and the small growers looked upon it as some new disease, calling it 'greasy scale'. Some loss from this cause was sustained in consequence of the shedding of the bolls.

The conditions of soil and climate under which the cotton industry is carried on in this small island compare so unfavourably with other islands, that the greatest credit is due to the small grower for the industry and attention necessary to produce an average crop. Mr. Carter Rey, the owner of the Central Cotton Ginnery, still continues his valuable work in connexion with the cotton industry, and it is largely due to his efforts that the industry has developed to such an extent.

The small growers are helped by Mr. Rey with advances from loans made to him by the British Cotton Growing Association and the local Government. When the cotton is reaped it is purchased by him at a definite price, and the amount advanced is deducted. At the close of the season the exact value of the cotton is taken from the invoiced prices, and if it exceeds the amount first paid for the seed-cotton, a bonus to that extent is declared and paid.

This system has worked well in the past, and is greatly appreciated by many of the growers of cotton.

### Crop Returns and Exports of Cotton.

At the time of writing this report the ginning in the Presidency for this season is completed. The return of cotton shipped from each island up to June 30, 1914, has been as follows:—

| | | |
|---|---|---|
| St. Kitts | ... ... ... ... | 345,633 lb. lint |
| Nevis | ... ... ... ... | 266,773 „ „ |
| Anguilla | ... ... ... ... | 94,372 „ „ |
| Total | ... ... ... ... | 706,778 lb. lint. |

The following table gives the return in pounds of the exports of lint cotton from the Presidency for the ten years ending December 30, 1913 :—

| Year. | St. Kitts. | Nevis. | Anguilla. | Total. |
|---|---|---|---|---|
| 1904 ... ... ... | 24,107 | 28,449 | 1,661 | 54,217 |
| 1905 ... ... ... | 87,070 | 144,721 | 31,997 | 263,788 |
| 1906 ... ... ... | 121,762 | 132,044 | 81,650 | 326,456 |
| 1907 ... ... ... | 269,109 | 136,670 | 59,666 | 465,445 |
| 1908 ... ... ... | 205,682 | 177,427 | 76,200 | 459,309 |
| 1909 ... ... ... | 230,940 | 116,998 | 56,120 | 404,058 |
| 1910 ... ... ... | 241,717 | 113,722 | 36,600 | 392,039 |
| 1911 ... ... ... | 348,908 | 306,590 | 127,495 | 782,993 |
| 1912 ... ... ... | 359,222 | 207,262 | 97,142 | 663,726 |
| 1913 ... ... ... | 425,597 | 184,387 | 112,138 | 722,122 |

# Progress in Minor Industries.

In St. Kitts there has been no attempt to develop any minor industries on commercial lines, the cultivation of sugar and cotton engaging the attention of the owners of land.

In Nevis, as will be seen from the report attached, the cultivation of coco-nuts at Pinneys estate has been most successful, and the vanilla cultivation at Maddens gives great hope of encouraging success.

In Anguilla experiments are being made with a trial plot of coco-nuts to find out if the conditions are suitable for their growth. So far, the young trees are coming on well, and if successful, the plots will be increased.

### General Agricultural Progress.

No important changes or improvements have taken place during the year in connexion with agriculture. An attempt was made to secure a Central Factory for the northern district of St. Kitts, but it was found impossible to attract capital under existing conditions.

### Introduction of Stock.

During the year a valuable stallion was introduced into Anguilla from Jamaica by Mr. Carter Rey who, with the help of a bonus given by the Imperial Department of Agriculture, imported this animal with the object of improving the breed of horses in the island.

A jack donkey was also imported from Jamaica by the Government of St. Kitts, for the purpose of improving the breed of donkeys. This animal is kept on estates in different districts, and a nominal fee is charged for his services.

# Instruction in Agricultural Matters.

A report on the agricultural side of the Grammar School has been prepared by Mr. J. A. Rowbotham, the Science Master, and is included in this report.

The cadet system has not been at work during the year, as there were no youths available from the Grammar School. This system has been very useful in the past in training lads for agricultural work, but there seems little chance of its being continued in connexion with the Grammar School.

Agricultural education in the primary schools remains in the same unsatisfactory condition, very little interest being taken in the matter of school gardens. At the Agricultural Show, held in February 1914, special prizes were again offered for school exhibits, but only one school was represented by a collection of vegetables.

In the Reading Courses and Examinations for Practical Agriculture one candidate came forward for the final examination. This candidate, Mr. A. E. Owen, is worthy of mention, as he passed the Preliminary Examination in 1909 in the first class, the Intermediate Examination in 1910 in the second class, and the final in 1913 in the first class.

The certificate of the Imperial Department of Agriculture for this examination was presented to Mr. Owen by His Honour the Administrator at the opening of the Agricultural Show, who also announced that as a result of Mr. Owen's good work and success in passing these examinations, he had been promoted to be Attorney and Manager of the estate on which he was working as Overseer.

# Extension of Interest in Agricultural Products, etc.

An Agricultural and Industrial Show, the eighth of its kind, was held on February 20, at the Grammar School, St. Kitts, under the auspices of the Imperial Department of Agriculture and the Agricultural and Commercial Society, St. Kitts.

The Show was formally opened by His Honour the Administrator who regretted the absence of His Excellency the Governor and the Imperial Commissioner of Agriculture, but welcomed Mr. H. A. Tempany, Superintendent of Agriculture for the Leeward Islands.

The number and quality of the exhibits showed a slight falling off as compared with the two previous exhibitions, and the prizes were not so keenly contested in the different classes. This was particularly the case in the live stock classes, which is a matter for regret.

The exhibits of sugar-canes were very fine, the twenty-four cut canes from Brighton estate weighing 250 lb. An exhibit of one of each of the varieties of canes grown at Molineux estate in connexion with the experimental work of the Department was contributed by that estate.

The exhibits of cotton were of a high standard, and that of cotton-seed cake, meal and oil, sent from Spooners Factory, was much admired.

In addition to the prizes offered, twelve Diplomas of Merit were awarded by the Imperial Department of Agriculture for exhibits of exceptional value. The exhibits for which these were awarded comprised the following: Native filly, native cow, native he goat, poultry, exhibit of canes, cotton and its products, blacksmith's work, preserves, and fancy work.

As in past years a special stall was arranged for the exhibit from the Botanic and Experiment Station, on which was shown the various economic products grown at these Stations.

The Agricultural Superintendent, as Honorary Secretary to the Agricultural and Commercial Society, is responsible, with the assistance of his staff, for the general arrangement and management of the Show.

## CANADIAN NATIONAL EXHIBITION.

An exhibit was collected and forwarded by the Permanent Exhibition Committee, of which the Agricultural Superintendent is Honorary Secretary, to the care of Messrs. Pickford & Black, Ltd., for exhibition at the Canadian National Exhibition held at Toronto.

This exhibit comprised sugars, molasses, rum, cotton (lint and seed-cotton), cotton-seed cake and meal, cotton-seed oil, meals and starches, preserves from native fruit, and pickles in brine.

Bunches of coco-nuts, sugar-canes, and palm branches were also sent for decoration purposes.

The total number of exhibits forwarded was ninety-six.

# Details of Administration.

## EXPENDITURE, RECEIPTS, SALES OF PLANTS, ETC.

The expenditure for the year was as follows :—

From Imperial Grant-in-aid :

| | | | |
|---|---|---|---|
| Special Services from Imperial Funds ... ... ... | £57 | 14 | 8 |

From Local Funds :

| | £ | s. | d. |
|---|---|---|---|
| Curator's salary and allowances ... ... ... ... | 260 | 0 | 0 |
| Foreman's salary and allowance ... ... ... ... | 50 | 0 | 0 |
| Agricultural Instructor, Nevis ... ... ... ... | 145 | 0 | 0 |
| Upkeep Botanic Station ... ... ... ... | 149 | 19 | 9 |
| Sugar-cane, cotton and other experiments ... ... | 198 | 2 | 11 |
| Experiments in Nevis ... ... ... ... ... | 36 | 6 | 3 |
| Keep of jack donkey ... ... ... ... ... | 8 | 1 | 10 |
| Agricultural education ... ... ... ... ... | 82 | 6 | 0 |
| Total from Local Funds ... ... ... ... | £929 | 6 | 9 |
| Total Expenditure ... ... ... ... ... | £987 | 1 | 5 |

The receipts were as follows :—

| | | | |
|---|---|---|---|
| La Guérite Economic Plots, sale of cotton, etc. ... ... | £228 | 11 | 7 |
| Botanic Station, sale of plants ... ... ... ... | 7 | 17 | 9 |
| Nevis Experiment Station, sale of produce ... ... | 7 | 14 | 4 |
| Total receipts ... ... ... ... ... | £244 | 3 | 8 |

## STAFF CHANGES.

There have been no changes on the permanent staff during the year.

The Curator went on four weeks' leave of absence owing to ill health in June 1913, during which time his duties were satisfactorily performed by the Foreman, Mr. N. J. L. Margetson.

Mr. Margetson was confirmed in his office as Foreman on August 12, 1913, after six months' probation.

The apprentice, C. Hoskings, after nearly two years' satisfactory service, resigned his post for a better appointment in a merchant's store.

## CORRESPONDENCE AND DISTRIBUTION OF INFORMATION ON AGRICULTURAL MATTERS.

Correspondence with the Imperial Commissioner of Agricultnre and the Superintendent of Agriculture for the Leeward Islands has been regularly carried on in connexion with the work of the Department and matters of local agricultural interest.

Copies of the publications of the Imperial Department of Agriculture, such as the *West Indian Bulletin* and Reports on Sugar-cane Experiments in the Leeward Islands, have been regularly received and distributed to persons interested.

Visits have been regularly paid by the Agricultural Superintendent to the estates on which the sugar-cane experiments are carried out, and during the cotton season frequent visits are paid to the estates in connexion with this industry, for the purpose of giving advice and assistance to all needing it.

The regular meetings of the Agricultural and Commercial Society, of which the Agricultural Superintendent is Honorary Secretary, form a useful medium for the distribution of information on agricultural subjects.

## PUBLICATIONS RECEIVED.

The following publications, in addition to those from the Imperial Department of Agriculture, were regularly received, and are here acknowledged :—

The *Kew Bulletin; Bulletin of the Department of Agriculture,* Jamaica; *Journal of the Jamaica Agricultural Society; Bulletin of the Department of Agriculture,* Trinidad; Local Department of Agriculture, Barbados, Seedling canes and Manurial Experiments; the *Philippine Agricultural Review; Experiment Station Record of the United States Department of Agriculture;* Reports on Experimental Farms, Canada; the *Louisiana Planter;* the German Kali Works, numerous circulars.

## OFFICIAL VISITS.

Mr. H. A. Tempany, B.Sc., Superintendent of Agriculture for the Leeward Islands, visited St. Kitts in April and May 1913, in connexion with the work of reaping the sugar-cane experiments. During his stay he visited many of the estates, and gave valuable help and information in syrup making. He also visited the Presidency in February 1914, being present at the Agricultural and Industrial Show. He visited Nevis on this occasion, and paid much attention to the condition of the cotton industry in that island,

Mr. H. A. Ballou, M.Sc., Entomologist of the Imperial Department of Agriculture, paid a special visit in January 1914, in connexion with insect pests attacking sugar-cane.

The Agricultural Superintendent, in connexion with his official duties, visited Nevis on five occasions during the year, inspecting the experiment station, the cotton and other cultivations, and supervising the work of the Agricultural Instructor.

He also accompanied the Administrator on an official visit to Anguilla, and was, for this purpose, absent from St. Kitts for six days in February 1914. His time was employed there in inspecting the cotton cultivation, and the trial plot of 1 acre of coco-nuts. A full report of this visit was forwarded, through the Administrator, for the information of His Excellency the Governor and the Commissioner of Agriculture.

Mr. H. Tryon, a member of the Prickly Pear (Travelling) Commission, of Queensland, Australia, with his Secretary Mr. Holland, visited St. Kitts-Nevis, at the end of January 1914.

## METEOROLOGICAL RETURNS.

### Rainfall.

The total rainfall for the year under review was 37·96 inches, which is 13·27 inches less than for the similar period of 1912-13. The rainfall was not only much less, but it was also most unequally distributed, as will be seen from the table attached.

The rainfall for the year ending December 31, 1913, was 42·63 inches, which is about the average of the past twelve years.

The following table gives the rainfall for the period under review; a table giving the rainfall for the past twelve years is also attached :—

| Month. | Rainfall in inches. | Number of days on which rain fell. | Maximum fall on one day. |
|---|---|---|---|
| 1913. | | | |
| April ... ... ... | 2·04 | 8 | 1·35 (15th) |
| May ... ... ... | 5·05 | 15 | 1·35 (5th) |
| June ... ... ... | ·82 | 10 | ·16 (4th) |
| July ... ... ... | 1·97 | 19 | ·29 (20th) |
| August ... ... ... | 3·19 | 14 | ·72 (18th) |
| September ... ... | 1·75 | 12 | 1·91 (20th) |
| October ... ... ... | 3·93 | 12 | 2·66 (10th) |
| November ... ... ... | 4·28 | 17 | 1·03 (26th) |
| December ... ... ... | 3·95 | 18 | ·50 (16th) |
| 1914. | | | |
| January ... ... ... | 3·37 | 16 | ·63 (20th) |
| February ... ... ... | 2·76 | 17 | ·72 (23rd) |
| March ... ... ... | 1·87 | 16 | ·40 (25th) |
| Total ... ... ... | 37·96 | 174 | |

Rain fell on 174 days during the year. The maximum rainfall on any one day was 2·66 inches, on October 10, 1913.

The rainfall at the Botanic Station for the past twelve years has been :—

| Month. | 1902 Inches. | 1903 Inches. | 1904 Inches. | 1905 Inches. | 1906 Inches. | 1907 Inches. | 1908 Inches. | 1909 Inches. | 1910 Inches. | 1911 Inches. | 1912 Inches. | 1913 Inches. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| January ... | ... | 0·92 | 3·51 | 2·13 | 2·25 | 1·45 | 1·29 | 7·31 | 2·44 | 4·98 | 2·69 | 6·67 |
| February ... | ... | 1·30 | 2·00 | 2·41 | 1·61 | 1·99 | 1·81 | 2·85 | 1·27 | 4·51 | 1·40 | 4·06 |
| March ... | ... | 1·83 | 2·03 | 1·43 | 2·57 | 0·67 | 5·50 | 1·92 | 1·71 | 2·30 | 1·15 | 2·94 |
| April ... | 3·90 | 2·08 | 1·94 | 2·41 | 3·79 | 0·97 | 0·75 | 1·12 | 1·83 | 1·36 | 3·01 | 2·04 |
| May ... ... | 11·75 | 1·12 | 2·03 | 1·45 | 3·35 | 4·63 | 2·05 | 1·23 | 0·90 | 4·37 | 1·06 | 5·05 |
| June ... ... | 4·76 | 2·43 | 2·19 | 5·20 | 9·39 | 2·80 | 2·86 | 5·62 | 3·45 | 2·25 | 2·86 | 0·82 |
| July ... ... | 4·59 | 2·23 | 3·89 | 3·40 | 1·86 | 2·57 | 3·39 | 4·46 | 1·64 | 3·34 | 2·59 | 1·97 |
| August ... | 1·34 | 4·23 | 6·95 | 3·23 | 0·58 | 2·15 | 6·44 | 8·43 | 4·47 | 2·18 | 2·19 | 3·19 |
| September ... | 4·22 | 4·22 | 8·38 | 5·03 | 18·36 | 2·42 | 3·98 | 1·99 | 8·51 | 3·49 | 7·61 | 4·73 |
| October ... | 2·80 | 7·46 | 3·75 | 3·64 | 2·50 | 10·77 | 4·33 | 3·01 | 3·74 | 4·92 | 7·13 | 3·93 |
| November ... | 7·36 | 3·78 | 2·25 | 3·75 | 3·51 | 1·86 | 7·99 | 6·92 | 4·20 | 3·02 | 8·80 | 4·28 |
| December ... | 4·66 | 4·45 | 2·32 | 2·11 | 5·94 | 4·13 | 4·23 | 4·71 | 4·51 | 6·37 | 2·40 | 3·95 |
| Total ... | 45·38 | 36·05 | 41·24 | 36·19 | 55·71 | 36·41 | 44·62 | 49·57 | 38·67 | 43·09 | 42·89 | 43·63 |

Average rainfall for the past twelve years 43·7 inches.

## Temperature.

Readings on the maximum and minimum thermometers and the wet and dry bulbs are taken daily at 9 a.m. and 3 p.m.

The mean monthly temperature was 79·9° F. The maximum reading was 88° F., registered on September 4 and 5, 1913. The minimum was 64° F., registered on January 19, 1914.

(Sgd.) F. R. SHEPHERD,

Agricultural Superintendent.

# APPENDIX.

## AGRICULTURAL SIDE OF THE GRAMMAR SCHOOL, ST. KITTS.

### REPORT FOR THE YEAR 1913-14.

| | | | |
|---|---|---|---|
| EXPENDITURE FROM LOCAL FUNDS: | | | |
| Scholarships ... ... ... ... ... ... | £76 | 0 | 0 |
| Equipment ... ... ... ... ... ... | 5 | 3 | 1 |
| FROM IMPERIAL FUNDS: ... ... ... ... ... | 6 | 0 | 0 |
| Total ... ... ... ... ... ... | £87 | 3 | 1 |

The grant from Imperial funds was expended in the purchase of a camera for use in connexion with the teaching of natural science.

In March 1913, the local vote for Agricultural Scholarships and Science equipment was reduced from £90 to £50. The reason for this retrograde step is unknown, and it is deplored by all who have a lively interest in agricultural progress. One very unfortunate result of the reduction is that the agricultural cadet system in St. Kitts-Nevis has come to an end, and is not likely to be revived.

In consequence of the reduced vote, two scholarships which became vacant in December 1913 were not filled, and the agricultural side was thus reduced from ten to eight students.

In December of this year there will be a further reduction of three students holding scholarships.

The result of the Cambridge Local Examinations, held in December 1913, are included in the report furnished by the Science Master, Mr. J. A. Robotham.

(Sgd.) W. H. Mitchell, M.A.,

Head Master.

## REPORT ON THE AGRICULTURAL CLASS AT THE GRAMMAR SCHOOL, ST. KITTS, FOR THE YEAR 1913-14.

During the major portion of the period under review the agricultural class consisted of ten boys, all of whom were holders of Agricultural Scholarships. Two scholars leaving the school in December 1913 reduced the number to eight. In January of the present year Agricultural Science was made optional with Latin as a school subject. As a result of the new arrangement five non-scholarship holders joined the class, bringing the number up to eleven.

The instruction in Agriculture follows broadly along the lines laid down by the Examination Syndicate of the University of Cambridge. Special attention is paid to practical work, and the School Laboratory is used as much as possible for this purpose. Such work includes the qualitative examination of soils, manures, and feeding-stuffs, together with experiments to demonstrate the principles underlying local agricultural practice.

Practical work out of doors includes instruction which is calculated to be of some use to a prospective planter. The spraying of fruit trees as a remedial

measure against attacks of insect pests may be mentioned in this connexion. The agricultural class has also been through a short course in Surveying, including the measurement and estimation of simple land quantities.

Six periods, varying from three-quarters to one hour each, are devoted per week to Botany. Frequent walks are arranged to the Botanic Station and elsewhere to study local plant œcology.

With regard to Chemistry, each of the three classes in the school has two periods of one hour each week for this subject. As a general rule one of these periods is set apart for experimental work in the Laboratory. The Laboratory has recently been improved by the addition of two glass windows on the eastern side. (Photographs illustrating the Laboratory are appended to this report.)

During the absence of the Science Master owing to illness from March 19 to May 26, 1913, the work in Chemistry was kindly taken by Mr. F. L. Mitchell.

The Cambridge Local Examination, held in December 1913, resulted as follows :—

| | | Number of candidates. | Passed. | Failed. |
|---|---|---|---|---|
| Senior. | Agricultural Science ... | 2 | 2 | — |
| | Botany ... ... | 2 | 2 | — |
| | Chemistry ... ... | 1 | 1 | — |
| Junior | Botany ... ... | 4 | 2 | 2 |
| | Chemistry ... ... | 3 | 3 | — |
| Preliminary | Botany ... ... | 3 | 2 | 1 |
| | Chemistry ... ... | 3 | 3 | — |
| | | 18 | 15 | 3 |

It is worthy of mention that in the Junior section two candidates obtained the mark of distinction. H. A. Mitchell was placed fifth in the list of those obtaining distinction out of 567 candidates sitting for Botany in the Junior examination. R. P. Winfield was distinguished in theoretical chemistry.

The school possesses a fairly well equipped library which is used by the agricultural class. Recent additions have included : *The Soil*, by Hall ; *Fertilizers and Manures*, by the same author ; *Agricultural Chemistry*, by Auld and Ker ; and *Plant Physiology*, by Darwin.

The publications of the Imperial Department of Agriculture are regularly received, and added to the library from time to time.

(Sgd.) J. A. ROBOTHAM,

Science Master.

# REPORT OF THE AGRICULTURAL INSTRUCTOR, NEVIS.

**For the Year ended March 31, 1914.**

## WORK IN THE NURSERY, AND DISTRIBUTION OF PLANTS.

### Condition of Garden, Nursery, Etc.

The condition of the garden continues to be satisfactory. The ornamental border leading from the northern gate has been kept in good order. The roses which were planted out last year have done well, and add much to the appearance of the border.

The low hedge of bread-and-cheese (*Pithecolobium Unguis-cati*) has been kept trimmed to form an edging.

The small stock of nursery plants has been fairly well kept up, but there is not a very ready sale for plants in the island.

### Distribution of Plants.

The total number of plants distributed from the Station was ninety, and consisted of the following:—

| | |
|---|---|
| *Aleurites Fordii* ... ... ... | 7 |
| *Casuarina equisetifolia* ... ... | 2 |
| Mulberry ... ... ... ... | 3 |
| Palms ... ... ... ... | 13 |
| Shade trees ... ... ... | 19 |
| Ornamental plants ... ... | 46 |
| | 90 |

### Plant Importation.

The importation of plants during the year was small, consisting chiefly of plants and seeds received from the Imperial Commissioner of Agriculture and from the Curator of the Botanic Station, St. Kitts. Among those received the following may be mentioned: *Pterocarpus Rohrii*, *Aleurites Fordii*, and *Juniperus pachyphlae*.

## Plot Experiments at the Experiment Station.

Experiments are carried on with various economic and food-producing crops, such as sweet potatoes, ground nuts, onions, yams, cassava, Mazzagua Guinea corn, Indian corn, and green dressings.

Seeds and cuttings of the above crops are freely distributed to growers throughout the island. The school gardens are also supplied with whatever seeds or cuttings they require.

## Plot Experiments with Food Crops, Nevis.

The following is a list of the seeds and cuttings which were distributed from the Station during the year :—

| | |
|---|---|
| Sweet potatoes ... ... ... | 15,000 cuttings |
| Cassava ... ... ... ... | 1,500 ,, |
| Yams ... ... ... ... | 30 lb. |
| Mazzagua Guinea corn (sold) ... ... | 64 ,, |
| Ground nuts ... ... . | 10 ,, |
| Indian corn .. ... .. .. | 8 ,, |
| Black-eye peas (sold) ... ... ... | 15 ,, |
| Cotton seed selected (sold) ... ... | 4,591 ,, |

### Plot A (Cassava and Sweet Potatoes).

Three varieties of cassava were planted in this plot on February 28, 1913.

The cuttings were first treated with Bordeaux mixture, and then planted 3 feet apart on banks 4 feet wide.

The cuttings germinated fairly well, but the crop suffered very much from drought, and the returns were not very good.

The crop was reaped on December 6, 1913; the following table gives the results of the experiment :—

| Variety. | Yield per plot of 5 rows in lb. | Calculated yield per acre in lb. |
|---|---|---|
| Santerley (6 rows) ... ... | 210 ... ... | 5,600 |
| Black Stick ... ... | 106 ... ... | 3,392 |
| Braziers ... ... ... | 100 ... ... | 3,200 |

The plot was manured and again prepared, and planted in a single variety of sweet potato (Six Weeks). The vines grew very luxuriantly, but the return was poor; only 264 lb. of potatoes were reaped from the plot.

### Plot B (Hybrid Cotton and Mazzagua Guinea Corn).

This plot was carefully prepared, and planted in hybrid cotton. The seeds used for planting were obtained from specially selected hybrids grown at the experiment station last season. The germination was good, and the plants all grew well for a time, but when they were about a month or six weeks old very many of them showed a peculiar stunted appearance. They continued to grow like this without improving On the whole, they were very different from their parents, being of a poor type, and not producing so many bolls. The experiment was discontinued and the plants destroyed. The plot was reprepared, and planted in Mazzagua Guinea corn. This crop did fairly well, and a return of 120 lb. of threshed corn was reaped from the plot.

### Plot C (Black-eyes and Onions).

A crop of sweet potatoes was reaped from this plot; it was then reprepared, and planted in black-eye peas as a green dressing. The green dressing was bedded under in preparing the plot for onions, and a light application of well rotted pen manure forked in afterwards.

The onion seeds recieved from Teneriffe were sown in nursery beds, and the young plants set out in the beds, 6 inches by 6 inches apart on October 30, 1913.

The weather was fairly good during the early part of the growth, but in December and January the rains fell off, which checked the growth, and caused the production of a number of small onions.

A return of 800 lb. of onions was reaped from the plot. They were all sold in the local market, and realized £5 11*s* 9*d*.

## Plot Experiments with Food Crops, Nevis.

### Plot D (Sweet Potatoes, Black-eye Peas, and Irish Potatoes).

Five varieties of sweet potatoes were planted in this plot in April. The weather was very much against the crop, and the returns were not very good.

The following table shows the result of the experiment :—

| Varieties. | Yield per plot of 3 rows, in lb. | Calculated yield per acre, in lb. |
|---|---|---|
| Mother Kitty ... ... | 60 | 3,200 |
| Caroline Lee ... ... | 40 | 2,132 |
| Harris's ... ... | 25 | 1,333 |
| Brass Cannon ... ... | 20 | 1,066 |
| Six Weeks ... ... | 15 (4 rows) | 600 |

The plot was afterwards put under black-eye peas as a green dressing. The green dressing was turned under in January, and the plot planted in Irish potatoes on February 3, 1914. The crop grew fairly well, but the return was poor ; only 80 lb. of potatoes were reaped from the plot.

### Plot E (Yams).

A crop of Mazzagua Guinea corn was reaped from this plot. The corn stalks were turned under early in April 1913, and the plot planted in eight varieties of yams on May 21. The cuttings were first treated with Bordeaux mixture, and then planted 2½ feet apart on banks 4 feet wide. The plot was then mulched with 6 loads of coarse pen manure. The crop suffered very much from want of rain, especially during the months of June and July, and the returns were very poor.

The following table gives the result of the experiment :—

| Varieties. | Yield per plot of 2 rows, in lb. | Calculated yield per acre, in lb. |
|---|---|---|
| Lisbon .. ... | 49 | 3,920 |
| Seal Top ... ... | 35 | 2,800 |
| Cush .... ... ... | 49 (3 rows) | 2,613 |
| Crop ... ... ... | 28 | 2,240 |
| Bugle Horn ... ... | 25 | 2,000 |
| Danish ... ... | 25 | 2,000 |
| Horn ... ... | 11 (1 row) | 1,760 |
| Light Red ... ... | 10 | 800 |

### Plot F (Lima Beans and Sweet Potatoes).

A crop of onions had been previously reaped from this plot. The plot was then planted with Lima beans as a green dressing. The beans were turned under in July, and eight varieties of sweet potatoes were planted in the plot on August 11, 1913.

In this experiment some of the varieties did fairly well. Below is a table showing the result of the experiment :—

| Varieties. | Yield per plot of 2 rows, in lb. | Calculated yield per acre, in lb. |
|---|---|---|
| Mother Kitty ... ... | 173 | 13,840 |
| Bobby ... ... ... | 104 | 8,320 |
| Caroline Lee ... ... | 102 | 8,160 |
| Blue Bell ... ... | 99 | 7,920 |
| Brass Cannon ... ... | 96 | 7,680 |
| Trinidad 1 ... ... | 52 | 4,160 |
| Harris's ... ... | 34 | 2,720 |
| White Gilkes ... ... | 20 | 1,600 |

### Plot G (Black-eye Peas and Indian Corn).

A crop of yams was previously reaped from this plot; afterwards black-eye peas were planted as a green dressing. The green dressing was turned under, and Indian corn planted in the plot on November 13, 1913. The corn germinated well, and grew very healthily at first; but the dry weather during December and January was very much against the crop: many of the plants were killed, and the experiment turned out to be a failure.

### Plot H (Ground Nuts).

A crop of cassava was reaped from this plot. The plot was then bedded for ground nuts. One half of the plot was planted in local ground nuts and the other in Spanish ground nuts.

The crop was planted on May 20, 1913, 12 × 12 inches apart in the beds.

The weather was fairly dry, and the germination was so poor that some amount of supplying had to be done. The crop, on the whole, had a hard time of it, and only 48 lb. of ground nuts were reaped from the plot in which the local nuts were planted, and 25 lb. from that in which the Spanish variety was planted, equal to 960 lb., and 500 lb., per acre, respectively.

### Hedges.

The hedges around the experiment station have been kept trimmed and in good order. As the roots from these hedges enter the experiment plots, and interfere with the experiments, it was found necessary to open trenches between the plots and the hedges.

### Cotton Demonstration Plot.

The 2 acres of land to the north of the experiment plots were again used this year as a cotton demonstration plot. The plot was carefully prepared, and planted on May 16, 1913. The seeds used for planting were obtained from specially selected plants grown in the plot last season. The seeds germinated fairly well, but dry weather came on, and many of the plants were killed, so a fair amount of supplying was necessary; it was not until towards the end of June that the plot was established.

A field of old cotton was still standing in the immediate neighbourhood of the demonstration plot, from which field the young cotton in the demonstration plot got badly infected with leaf-blister mite (*Eriophyes gossypii*). Every effort was made to keep the leaf-blister mite in check, but on account of the drought and the non-removal of the source of the infection, this was found a very difficult task.

As might be expected, the return was very poor—only 628 lb. of seed-cotton was reaped from the plot. The seed-cotton was sold to the Charlestown Factory at the rate of 3½*d.* per lb.

The hedges around the plot have been kept trimmed, and in good order. These hedges, while they are of great use in keeping out animals that are sometimes pastured on the adjoining land, are a great hindrance to the development of the cotton plants near to them, on account of their roots entering the plot.

### Cotton Selection Work.

A small plot was laid out in the demonstration plot as a nursery for carrying out work in seed selection, but the plants were so badly infected with leaf-blister mite, and the number of bolls per tree was so small, that it was thought not worth while to carry on the work with this strain.

### WORK IN CONNECTION WITH INSECT AND FUNGUS PESTS AND THEIR CONTROL.

Specimens of diseased plants were sent to the Head Office from time to time for examination. These were reported on, and suggestions given as to methods of control.

The cotton in certain localities was observed to be attacked by a disease which caused the leaves on the upper branches to curl up. The plants were observed to be more attacked during damp weather and in sheltered localities. The disease is considered very serious, inasmuch as it prevents the formation of any bolls. Specimens were sent to the Head Office for examination, and arrangements have been made to carry out investigations during the coming season. Notes as to the occurrence of insect and fungus pests on the crops grown in the island are forwarded to the Head Office at the end of each year.

In accordance with the provision of the Plant Protection Ordinance, twenty-one consignments of plants and seeds were received at the Experiment Station for fumigation or disinfection.

The plants and seeds are treated with carbon bisulphide, Bordeaux mixture, or corrosive sublimate.

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## Progress in the Chief Industries.

### THE SUGAR INDUSTRY.

Experiments with fifteen varieties of sugar-cane were carried out at Round Hill and at Cane Garden estates in connexion with the work of the Experiment Station. The canes were weighed in the field under the supervision of the Agricultural Instructor, and a sample of 100 lb. was taken from each variety and sent to the Government Laboratory at La Guérite, St. Kitts. The results, on the whole, are more satisfactory than last year's ; some of the varieties did fairly well. An account of these experiments is published in the Official Reports on Sugar-cane Experiments in the Leeward Islands for the season 1913.

On account of the very low price for sugar, the acreage under cane cultivation was considerably reduced.

Again this season the drought has been very unfavourable to the crop, and the returns were very poor.

Not much sugar was made in the island, as most of the canes were sold to the St. Kitt's Central Factory.

### COTTON.

The area under cotton cultivation remains about the same as last year's, namely 2,500 acres.

While a fair amount of cane lands was put into cotton this season, much of the bush-land cleared last year was not again replanted.

The greater part of the crop was planted during the month of May. The seeds germinated well, but the dry weather of June and July was a great set-back to the

crop, and there was no chance of supplying before August. A few fields were planted in June and July, but these were practically replanted in August, from which time on the weather was more favourable.

The crop, on the whole, was very much better than last year's, as much as 250 lb. of lint per acre having been reaped from some fields, although the average return throughout the island is about 120 lb. of lint per acre.

The cotton worm (*Alabama argillacea*) was not so severe in its attacks as it was last season, although in some places it was very troublesome. Very little damage was done to any field save in a few instances where the Paris green poison was carelessly mixed by some of the larger growers.

Leaf-blister mite occurred to a considerable extent in some of the early fields, which very much reduced the returns.

Mildew and boll dropping occurred in many fields during November and December.

The crop, on the whole, has been favourably reported on, and the greater part of it was sold at prices ranging from 18*d*. to 19*d*. per lb.

### Insecticides.

A supply of 2,254 lb. of Paris green and 89 bags of lime was stocked by the local Government for the benefit of small growers. This is supplied to the growers at cost price, either for cash, or upon their signing an agreement to pay when the crop is reaped. Paris green is supplied at the rate of 1*s*. per lb., lime at 3*s*. per bag, or 4lb. for 1*d*.; mixture of Paris green and lime (1lb. of Paris green to 6lb. of lime), 2*d*. per lb.

For the convenience of those growers living at some distance from the Experiment Station, where the insecticide is kept, arrangements were made to have supply stations within easy reach, namely at Old Manor estate, and at Eden Brown estate.

Over 120 small growers were supplied with insecticide from the Experiment Station during the year, and very nearly the same number from the other supply stations.

The total amount of Paris green and lime supplied during the year 1913-14, including that supplied from the out-stations, was 340lb. of Paris green and 57 bags of lime.

This arrangement is of very great help to the industry, and is appreciated by all classes.

## Progress in the Minor Industries.

### Coco-nuts.

The coco-nuts at Pinneys estate continue to be satisfactory; the trees are perfectly healthy, and are bearing well. The area now under cultivation is about 220 acres.

The trees in some parts of the plantation are not growing so vigorously, or bearing so well as those in other parts. There is reason to believe that this condition is due to poor soil, and arrangements are being made to carry out manurial experiments in the plantation under the supervision of the Department of Agriculture.

During the year. 41,400 nuts were collected. A fair number of these were used for planting purposes, and the rest were shipped to the New York market, where good prices were realized.

Other small plantations exist in the island.

### Onions.

Twenty-five pounds of white and 9 lb. of red Bermuda onion seeds were imported from Teneriffe through the Imperial Department of Agriculture, and sold to growers at cost price.

The crop did not do as well as last year, chiefly on account of the dry weather of December and January.

This crop is without doubt a remunerative one, but the growers plant only enough to supply the local market, and no attempt has been made to grow for export.

### Vanilla.

The vanilla at Maddens estate is in very good condition; the vines are all perfectly healthy and vigorous. Most of the vines are coming into bearing, and a fair crop of beans has been reaped, but there is still some difficulty with regard to the curing.

## Extension of Interest in Agricultural Products.

### Exhibitions.

No Agricultural Show was held during the year as it was thought best to hold one every alternate year instead of annually.

### Agricultural Education.

The work on the school gardens has been fairly satisfactory, especially at Brown Hill and at St. John's schools.

The school gardens are supplied with seeds and cuttings from the Experiment Station, and the plots are visited by the Agricultural Instructor, and advice given with regard to the work on the school beds.

The children, on the whole, show great interest in the work in the school gardens, especially the children in the country; and there is room for work of considerable value in connexion with these school gardens.

## Details of Administration.

### STAFF CHANGES.

Mr. George Walwyn, the Foreman, resigned his post on October 27, 1913, and Mr. Jos. Hanley was appointed in his place.

### ADDITIONS AND REPAIRS TO BUILDINGS.

No additions or repairs were made to the building during the year under review.

## CORRESPONDENCE. AND DISTRIBUTION OF INFORMATION ON AGRICULTURAL MATTERS.

Correspondence has been regularly carried on with the Commissioner of Agriculture and the Agricultural Superintendent at St. Kitts, on matters of general agricultural interest to the island.

The publications of the Imperial Department of Agriculture and the Annual Reports of the Botanic Stations have all been regularly received. Besides these, the following publications have also been received regularly, and are here gratefully acknowledged: The *Journal of the Jamaica Agricultural Society*, the *Philippine Agricultural Review*, the *Experiment Station Record* of the United States Department of Agriculture, and the *Journal of Agricultural Research* of the Department of Agriculture, Washington, D.C.

A great deal of the Agricultural Instructor's time is taken up in distribution of information on agricultural matters, which is done by means of regular visits paid to each district in the island, when advice on cultivation and the general care of crops is given to the smaller growers, and also to the planters who desire advice or assistance.

Special efforts were made to improve the method of dealing with the cotton worm. To this end the Agricultural Instructor carried with him on his rounds a small supply of insecticide, and dusting bags, and showed how the poison should be mixed and applied

Again this year an attempt was made to record the number of small growers and the acreage under cotton, so as to ascertain more accurately the number of acres under cotton cultivation in the island, and to bring the Agricultural Instructor into closer touch with the small growers.

These regular visits also enable the Agricultural Instructor to detect any insect or other pests likely to damage the crop, and to offer advice on the spot as to the best means of dealing with them.

The school gardens in the different districts are also visited, and advice is offered with regard to the work in progress.

## OFFICIAL VISITS.

Mr. H. A. Tempany, the Agricultural Superintendent for the Leeward Islands, visited the island on February 17, 1914.

Mr. Tempany remained in the island for two days, during which time he visited the Experiment Station, the coco-nuts at Pinneys estate, the vanilla and limes at Maddens estate, and saw many of the cotton plantations in the island. Mr. F. R. Shepherd, the Agricultural Superintendent for St. Kitts-Nevis, visited the island many times during the year, and gave advice on agricultural matters in general.

## OTHER VISITS.

The number of visitors who recorded their names at the Station was forty-two; these were chiefly from the neighbouring islands.

Mr. H. C. Henrickson, the director of the German Kali Works at Trinidad, visited Nevis on April 13, 1913, and on his way around the island visited the coco-nut plantation at Pinneys estate.

Mr. H. Tryon of the Queensland Prickly Pear (Travelling) Commission visited the island on January 29, 1914.

## METEOROLOGICAL RETURNS.

### Rainfall.

The total rainfall for the year was 38·60 inches, which is 6·92 inches less than that of last year.

Rain fell on 127 days during the year; the heaviest fall recorded for any one day was 1·54 inches, which occurred on August 6, 1913.

The tables attached show the rainfall at the Experiment Station for the year, and for the past eight years :—

| Month. | Rainfall in inches. | No. of days on which rain fell. | Maximum fall on any one day. |
|---|---|---|---|
| 1913. | | | |
| April ... ... ... ... ... | ·81 | 6 | ·40 (25th) |
| May ... ... ... ... ... | 4·47 | 11 | ·90 (16th) |
| June ... ... ... ... ... | 2·23 | 13 | ·76 (23rd) |
| July ... ... ... ... ... | 1·77 | 8 | ·88 (26th) |
| August ... ... ... ... | 4·92 | 12 | 1·54 (6th) |
| September ... ... ... ... | 3·50 | 10 | 1·50 (12th) |
| October ... ... ... ... | 3·89 | 16 | ·50 (17th) |
| November ... ... ... ... | 4·41 | 12 | ·85 (12th) |
| December ... ... ... ... | 3·36 | 12 | ·46 (12th) |
| 1914. | | | |
| January ... ... ... ... | 3·40 | 8 | ·96 (20th) |
| February ... ... ... ... | 2·74 | 6 | ·96 (22nd) |
| March ... ... ... ... | 3·10 | 13 | ·71 (25th) |
| Total .. ... ... ... | 38·60 | 127 | |

RAINFALL AT THE EXPERIMENT STATION, NEVIS, FOR THE PAST EIGHT YEARS, 1906-13.

| Months. | 1906 Inches | 1907 Inches | 1908 Inches | 1909 Inches | 1910 Inches | 1911 Inches | 1912 Inches | 1913 Inches |
|---|---|---|---|---|---|---|---|---|
| January ... ... | 3·28 | 3·22 | 2·58 | 3·86 | 5·24 | 6·38 | 3·84 | 7·18 |
| February ... ... | 2·22 | 2·32 | 1·70 | 3·46 | 2·82 | 2·78 | ·68 | 1·96 |
| March ... ... | 1·71 | 1·23 | 7·16 | ·96 | 1·33 | 2·32 | 2·66 | 4·14 |
| April ... ... | 2·49 | 1·08 | 2·18 | 2·72 | ·44 | 4·02 | 4·20 | ·81 |
| May ... ... | 3·94 | 3·30 | 4·24 | 1·62 | 1·08 | 4·08 | ·79 | 4·47 |
| June ... ... | 7·30 | 4·12 | 2·83 | 9·52 | 4·24 | ·92 | 2·51 | 2·23 |
| July ... ... | 4·11 | 4·86 | 3·34 | 4·52 | 2·80 | 2·72 | 3·56 | 1·77 |
| August ... ... | 2·94 | 2·64 | 5·02 | 8·71 | 7·10 | 2·34 | 3·46 | 4·92 |
| September... ... | 18·93 | 3·76 | 6·98 | 3·46 | 7·00 | 5·30 | 3·19 | 3·50 |
| October ... ... | 3·10 | 6·92 | 1·44 | 7·38 | 1·86 | 3·58 | 5·25 | 3·89 |
| November ... ... | 3·42 | 2·54 | 6·93 | 2·44 | 3·32 | 2·80 | 6·43 | 4·41 |
| December ... ... | 6·67 | 7·46 | 6·10 | 2·74 | 4·68 | 8·84 | 2·85 | 3·36 |
| Total ... ... | 60·11 | 43·45 | 50·50 | 50·69 | 41·91 | 46·08 | 39·42 | 42·64 |

TEMPERATURE.

Readings of the maximum and minimum thermometers and the wet and dry bulbs are taken daily at 9 a.m., and at 3 p.m.

The mean temperature during the year 1913-14 was 81·9° F. The maximum reading was 89° F., registered on September 5, 1913, and the minimum on December 26, 1913.

W. I. HOWELL,

Agricultural Instructor.

# Publications on Sale

## OF THE IMPERIAL DEPARTMENT OF AGRICULTURE

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### The 'WEST INDIAN BULLETIN'. A Quarterly Scientific Journal.

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Volume XIV, No. 3.—Containing papers on:—A Veterinary Survey of the Windward and Leeward Islands, by P. T. Saunders, M.R.C.V.S.; Epizootic Lymphangitis, by P. T. Saunders, M.R.C.V.S.; Agricultural Education and its Adaptation to the Needs of the Student, by Dr. Francis Watts, C.M.G.; The Budding of Cacao, by Joseph Jones; The Analysis of Citrate of Lime and Concentrated Lime Juice; Specific Gravities of Cane Sugar Solutions at 30°C. (Douglas); Report on the Prevalence of some Pests and Diseases in the West Indies during 1913.

### PAMPHLET SERIES.

The Pamphlets are written in a simple and popular manner, and the information contained in them is especially adapted to West Indian conditions. They contain, amongst other subjects, summaries of the results of the experiment work on sugar-cane and manures up to 1909-10, the full official reports of which have only a limited circulation. The number issued up to the present time is seventy-seven. Those mentioned in the following list are still available; the rest are out of print:—

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in 1905-7, No. 49; in 1906-8, No. 59,
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## The Fortnightly Illustrated Review of the Imperial Department of Agriculture for the West Indies.

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